Environment, Health and Safety Division
Environmental Restoration Program

July 3, 2000
ERP-2587

Michael Rochette
Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Ste. 1400
Oakland, CA 94612

Subject: Responses to RWQCB Comments on the May 1999 *Draft* Tritium Sampling and Analysis Plan for Lawrence Berkeley National Laboratory Environmental Protection Group

Dear Mr. Rochette:

Enclosed is the Berkeley Lab's responses to the San Francisco Regional Water Quality Control Board comments on the May 1999 *Draft* Tritium Sampling and Analysis Plan for Environmental Protection Group at the Berkeley Lab.

If you have any questions or comments, please contact me at (510) 486-6106.

Sincerely,

Iraj Javandel
Environmental Restoration Program

Encls.

cc: Phillip Armstrong (USEPA)
Shelly Rosenblum (USEPA)
Edgar Bailey (CA DHS)
Salvatore Ciriello (DTSC)
Tony Natera (DTSC)
Nabil Al-Hadithy (City of Berkeley)
Hemant Patel (DOE)
Pamela Shivola (Committee to Minimize Toxic Waste)

Responses to General Comments

1. In 1991, the United States Environmental Protection Agency (USEPA) initially evaluated Berkeley Lab under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for possible inclusion on the federal Superfund National Priorities List (NPL). At that time, USEPA determined that Berkeley Lab did not qualify for the NPL. In 1997, USEPA was petitioned by the Committee to Minimize Toxic Waste to re-evaluate Berkeley Lab for possible inclusion on the NPL using data generated subsequent to the 1991 determination.

   USEPA released its Superfund Evaluation Report in August 1998, with a preliminary finding that Berkeley Lab is eligible for the Superfund list because ambient tritium levels sometimes exceeded USEPA's screening criteria. However, USEPA had no immediate plans to add Berkeley Lab to the list because it recognized that tritium emissions at the National Tritium Labeling Facility (NTLF) are well below national public health standards set under the federal National Emission Standard for Hazardous Air Pollutants (NESHAPs) regulations under 40 CFR Part 61. USEPA reported that while the National Tritium Labeling Facility (NTLF) operations have resulted in small tritium levels in nearby groundwater, surface water, soil, and tree leaves, the data do not show significant tritium concentrations to require cleanup.

   USEPA, however, requested supplemental information before it could complete its Superfund evaluation of Berkeley Lab. In a letter to the United States Department of Energy (DOE) dated September 3, 1998, USEPA requested that additional data be collected on the magnitude and extent of tritium concentrations in soil, surface water, sediment, and ambient air, in accordance with Superfund Hazard Ranking System (HRS) requirements. Berkeley Lab prepared the Draft Tritium Sampling and Analysis Plan (TSAP) in response to this request. As indicated in their August 4, 1998 newsletter, USEPA was aware at the time of their evaluation that the tritium level in groundwater at one sampling location exceeded the drinking water standard set by the Safe Drinking Water Act; however, groundwater, was not included in their evaluation since it is not a drinking water source.

Berkeley Lab has performed a preliminary estimate of the contribution of the groundwater pathway to HRS scoring based on the 40 CFR Part 300 (Hazard Ranking System, dated December 14, 1990). Although groundwater is not used as a drinking water source, it can be included in the HRS scoring as a loss of a resource, if it is potentially usable for drinking water. Based on Berkeley Lab's evaluation, the maximum potential contribution to the overall HRS score would be less than 0.2, that is two orders of magnitude lower than the Superfund eligibility threshold.

Berkeley Lab has been systematically investigating the impact of tritium releases to the groundwater since 1990. Berkeley Lab has presented planned groundwater characterization activities and results of groundwater sampling to the Regional Water Quality Control Board (RWQCB) at Quarterly Review Meetings since January 1992 and at workshops held with the regulatory agencies since 1995. Berkeley Lab has been responsive to concerns expressed by RWQCB at these forums. The monitoring wells sampled and the frequency of groundwater sampling for tritium are carried out in accordance with a schedule reviewed and approved by RWQCB. Sampling activities are conducted in accordance with requirements of the Berkeley Lab Environmental Restoration Program Quality Assurance Program Plan, to produce reliable results that are technically defensible. Berkeley Lab will continue to work with RWQCB to address concerns, and will be glad to split groundwater samples with RWQCB or any other regulatory agencies wishing to do so. In addition, Berkeley Lab will compare the most recent groundwater information with the result of the model used in the 1997 Berkeley Lab Tritium Health Risk Assessment (THRA).

2. Section 7.1, Page 37, of the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, dated June 1999, is titled East Bay Plain Boundaries. This section states "The East Bay Plain is an elongated, northwest trending flat alluvial plain encompassing about 115 square miles (Figure 9). The East Bay Plain, as defined by DWR (1980), is bounded on the west by San Francisco Bay, by San Pablo Bay to the north, and by the Hayward Fault to the east." The Berkeley Lab property is located on bedrock east of the Hayward Fault and not in the East Bay Plain.

Moreover, the State Water Resources Control Board Resolution No. 88-63, that was adopted by the RWQCB Resolution No. 89-039, exempted the following case from the "Sources of Drinking Water." "The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day." Berkeley Lab has examined three representative wells in the area under consideration. None of these wells could produce an average sustainable yield of more the 80 gallons per day.

The Draft Environmental Health Risk Assessment for Tritium Releases at the National Tritium Labeling Facility was submitted to the Berkeley Lab regulatory agencies, including RWQCB, on October 5, 1995. The risk assessment addresses current potential exposures. The document was discussed at the Quarterly Review Meetings and regulatory agency workshops. In 1996, the draft document was submitted to the California Department of Health Services, the USEPA Region 9, and the Agency for Toxic Substances and Disease Registry (ASTDR) for review and comment. Comments were received from the three agencies and all were satisfactorily addressed.

3. Tritium air emissions are well below national public health standards set under the federal NESHAPs regulations under 40 CFR Part 61. However, Berkeley Lab agrees that its efforts should be focused on pollution prevention and ongoing source reduction. The Lab is continuously looking at ways to reduce tritium emissions. Some of the more recent efforts are: (1) Several tritium monitors were purchased and installed to identify tritium emission sources and provide information for future emission reduction planning; (2) A tritium cleanup unit was designed, built and used for cleaning the air in the glove boxes prior to directing it through the existing silica gel cleaning unit; and (3) The tritium reaction system was replaced by a low-volume version to reduce the amount of tritium needed for labeling activities. These efforts have resulted in more than an order of magnitude reduction in emissions since the late 1980s. The Lab is committed to continue in its efforts to reduce emissions.

Responses to Specific Comments

1. Section 1.1 provides the background to the Tritium Sampling and Analysis Plan. Paragraph 2 on Page 4 discusses the history leading to USEPA request for supplemental information. Presentation of any recent groundwater information in this paragraph is out of context. In addition, historical groundwater data are not relevant to this sampling plan since groundwater is not a media proposed for sampling. As noted above in the response to general comment #1, USEPA is aware that concentrations of tritium in groundwater exceed the drinking water standard at one sampling point; however, they have not requested additional groundwater data to complete their Superfund evaluation. As was discussed in responses to general comment #1, the contribution of groundwater pathway to HRS scoring is minimal.

2. As described in the DOE responses to the USEPA Consolidated Comments, Objectives of the Tritium Sampling and Analysis Plan are:

    - collect data of appropriate type and quality for USEPA to decide whether to place the site on the National Priorities List (NPL) and
    - collect data of the appropriate type and quality to evaluate the tritium levels used as input in the Environmental Health Risk Assessment for Tritium Release at the National Tritium Labeling Facility at Lawrence Berkeley National Laboratory (McKone *et al.*).

    The Tritium Sampling and Analysis Plan was prepared at the request of USEPA for their HRS scoring requirements. USEPA requested that Berkeley Lab include the collection of additional samples from four specific environmental media (air, soil, surface water, and sediment) in the Plan, to obtain the appropriate data to complete their HRS scoring evaluation. In addition, to address community concerns, vegetation sampling was also included in the Plan. Collecting data for future risk assessments is not an objective of the Plan. Currently, there is no complete drinking water exposure pathway to humans. Based on groundwater monitoring conducted since 1992, the tritium plume is stable and there is no off site migration of tritium in the groundwater.

3. Figure 2.1 will be revised to include RWQCB.

4. Text will be added to reflect that RWQCB may provide recommendations if water quality objectives are impaired.

5. Berkeley Lab has not collected tritium soil gas samples. Soil gas sampling is not generally used for tritium investigation. No complete groundwater exposure pathways for drinking water is present in Berkeley Lab Tritium Health Risk Assessment Zones 1 and 2, and there is no contamination in groundwater in Zone 3. Therefore, recent groundwater information will not have any effect on the risk assessment. Berkeley Lab intends to prepare an ecological risk assessment for radiological substances detected in soil. A copy of this assessment will be submitted to RWQCB for review.

    - "Identification of all existing and potential groundwater beneficial uses" and "Land or groundwater use restriction" are not generally addressed in risk assessment documents. The first one belongs to an environmental impact report and the second one is a part of a risk management document.

    - "Identification of horizontal and vertical preferential pathways" and "Evaluation of potential tritium sources such as sanitary sewer or storm water pipelines" are parts of site investigations and have been conducted independent of the risk assessment.

    - "Characterization of risk associated other radionuclides other than tritium" were not included in the scope of Tritium Health Risk Assessment (THRA).

    - "Determination of background and ambient conditions" are covered in Chapter 2 of the THRA.

6. As described in the DOE responses to the USEPA Consolidated Comments, a decision rule will be associated with total tritium concentrations. The plan will be revised to include criteria for taking additional samples, depending on the total tritium results.

7. Text will be added providing the rationale for selecting the specific analytical method for the media sampled in Section 3.4 (Analytical Methods Requirements). The USEPA Method 906 was selected for the analysis of tritiated water (HTO) since it is the only USEPA approved method available. Azeotropic distillation was selected for the analysis of free water tritium (FWT) or tritiated water (HTO) in soil, sediment, air (silica gel), and vegetation since it offers the lowest commercially available detection limits and there is no USEPA approved method. Flame combustion was selected to determine concentrations of organically bound tritium (OBT) since it is the most effective commercially available method for detecting all OBT in a sample.